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ABSTRACT

A study investigated whether high school students employ different study strategies in different content areas and whether their study strategy selections are influenced by the degree to which they are familiar with these topics. Subjects, 79 high school juniors, read one familiar and one unfamiliar passage from both history and chemistry textbooks. Results of the study strategy usage inventory indicated that students did not base their selection of study strategies on either their familiarity with the material or the content being studied. Findings suggested that students may be unable to make the fine discriminations among studying behaviors that are needed to assess the differences between benefits of various study strategies. Results showed that students' study strategies have little impact on their comprehension of material. The following implications relevant to college reading specialists derive from these results: (1) more specific descriptions of student study habits are needed, (2) the notion that high school students engage in activities believed effective for learning content should be examined, (3) researchers should employ more than one form of comprehension assessment, and (4) college reading personnel and secondary content teachers must cooperate to create an integrated, student-centered program. (JD)

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An Investigation into the Self-selected Study Strategies Used by College Bound Secondary Students: Implications for the College Reading Specialist

Running Head: SELF-SELECTED STUDY

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An Investigation into the Self-selected Study Strategies Used by College Bound Secondary Students: Implications for the College Reading Specialist

Many college reading practitioners devote a major portion of instructional time to the teaching of study strategies. Most have encountered frustration when students fail to employ the strategies taught in class. Perhaps one reason for students' rejection of study strategies is the lack of consideration by instructors of what students have done in the past to study and learn information. The awareness of how students study prior to training may facilitate instruction of study strategies. Specifically, if instructors attempt to assimilate students' preferred study methods with those taught in the college reading program, students may be more likely to apply strategies taught them.

The issue of self-selected study strategies has received little attention when compared to the abundance of research findings generated by "training studies" wherein subjects are trained to apply a particular study strategy or method, and the method is subsequently evaluated in terms of its effectiveness as measured by some form of comprehension test. Nevertheless, a small body of research does exist, stemming from the early 1900's to the present. An early study by Baldwin (1909) dealt with the study methods used by students in grades 6 through 12. Of twelve study methods reported by students, activities such as reading, reading

and reciting, and memorizing were used by 82% of Baldwin's subjects. Later research conducted by Charters (1924) and Garth (1920) produced similar findings. In fact, Charters noted that students are "usually unaware of the logical steps of learning upon which our textbooks in methods of study are based" (p. 351).

Although Baldwin's study took place over 75 years ago, findings and conclusions of today's researchers are strikingly similar. For example, studies by Annis and Annis (1982), Annis and Davis (1978), Brennan, Winograd, Bridge, and Hiebert (1986), Garner (1982), and Goetz and Palmer (1983) have generally found that students at the college level tend to study by engaging in activities such as rereading, underlining, or taking notes from the text, activities very similar to those identified in Baldwin's study. Similarly, research with high school sophomores enrolled in biology and history classes indicated memorizing and rereading as the most popular study methods (Schallert and Tierney, 1980).

The present study was an attempt to identify the self-selected study strategies used by high school juniors under varying conditions. One aspect of the study involves the notion that students may employ different study strategies in various subject areas. At present, little is known about these potential differences. A second aspect relates to the degree to which students' familiarity with a topic influences their study strategy selection and use.

Many studies have shown that students' familiarity with a topic affects their comprehension of material dealing with the topic (e.g., Baldwin, Peleg-Bruckner, & McClintock, 1985; Berkowitz and Taylor, 1981; Hare, 1981). However, no known research exists which relates to the effect of prior knowledge on the study strategies selected by students to comprehend and learn from expository text.

This study is an examination of the degree to which prior knowledge of a topic affects self-selected study strategies and comprehension in two content areas, history and chemistry. The research method used in the study involved an attempt to address two limitations of existing research. First, as Brown noted in 1981, most of the study strategy research has concentrated on the study activity of adults, usually college students. For those interested in the study behaviors of college students, it is important to consider the initial attempts at studying content materials made by high school students. Second, with the exception of the research conducted by Schallert and Tierney (1980) and Brennen et al. (1986), expository passages have been limited to between 400 and 600 words. When students study content area subjects, they usually are responsible for reading several pages as a reading or homework assignment. Also, many of the passages used in research have been excerpted from standardized reading tests or were constructed by the researcher(s). These short and sometimes artificial

passages may not provide a realistic picture of the reading demands or study strategies of students (Amarel, 1982).

METHOD

Subjects

Subjects for this study were 79 eleventh grade students reading at or above grade level as determined by the comprehension subtest of the Comprehensive Test of Basic Skills (CTBS, 1981). The subjects were enrolled in either intact history or chemistry classes and had not had any prior training in the use of study strategies. The subjects were taught by one teacher in history or one in chemistry; thus only two teachers were involved in data collection.

Materials

Passages read by subjects were drawn directly from history and chemistry textbooks intended for high school juniors, but not in use at the study site. Two passages were selected from each subject area; one was designated as familiar, one as unfamiliar, for a total of four passages. The familiar/unfamiliar designations were established from results of a pilot study conducted with 11th graders at a similar school. The passages were four to five pages in length, ranging from 1,300 to 1,600 words. A readability estimate on each of the passages revealed that all were written at the 12th grade level. Although the Raygor Readability Estimate (1977) indicated that the passages were written one year above the subjects' grade level, analyses of several similar textbooks produced the same results.

A 10-item multiple-choice comprehension test for each of the four passages was designed by the experimenter with the aid of the two teachers participating in the study. Questions focused on tapping subjects' literal and inferential understanding of the major concepts presented in the passage. The passage dependency of the questions was confirmed by a separate group of eleventh graders and a panel of reading educators.

An inventory of study strategy usage was developed based on information gleaned from subjects in a pilot study and on an inventory developed by Schallert and Tierney (1980). This forced-choice measure contained 12 items to which subjects responded with "yes" or "no".

Procedure

The data were collected by the subjects' teachers during their history and chemistry class periods. Passages in each subject area were randomly assigned so that subjects received either the familiar passage or the unfamiliar passage. The teachers were instructed to assign subjects to read and study the passage overnight and informed the students that a multiple-choice quiz would be given over the material the following day. Finally, the teachers asked the subjects to "think about how you attempt to study the material--what you do to try to learn the information in the passage."

The next day, subjects were administered the appropriate multiple-choice comprehension quiz. Subjects

were then asked to respond in writing to the directive: "Please write down the method(s) or way(s) in which you tried to study and learn the information contained in the passage." When all written responses were collected, the teachers distributed the inventory of study strategy usage.

Following data collection, subjects' responses to the open-ended study strategies inventory were tallied and grouped into four different patterns of study. The patterns are (a) skim or read parts of the passage, (b) read or read and memorize the passage, (c) read and review or read and reread the passage, and (d) multiple strategies (i.e., underline, take notes from the passage, or have others ask questions about the passage). Subject assignment to one of the four patterns is shown in Table 1.

Forced-choice inventory responses were also tallied and grouped into four patterns. Patterns established for the forced-choice inventory are (a) skim or read parts of the passage, (b) read only, (c) reading and thinking activities, and (d) reading and physical activities (see Table 2).

RESULTS

Data generated from the study were analyzed using two procedures. Chi-square analyses investigated the relation between self-selected study strategies and (a) text content, or (b) familiarity of text. There were no significant differences evidenced in any of the analyses for both the open-ended and the forced-choice measures of study strategy use.

Eight separate ANCOVAS were performed to determine the effect of study strategies selected by subjects on comprehension within each of the four conditions: history/familiar, history/unfamiliar, chemistry/familiar, and chemistry/unfamiliar. Four ANCOVAS were computed for study patterns formed from the open-ended study strategies inventory and four other ANCOVAS were computed for patterns formed from the forced-choice inventory. In terms of performance on the comprehension measure, results of all but two of the analyses indicated no significant differences among the study patterns used by subjects. The exception is for subjects who read the familiar chemistry passage. For these subjects, significant effects were found among both the open-ended and the forced-choice study patterns, $F(3,19) = 4.12$, $p < .05$; $F(3,19) = 3.25$, $p < .05$. Sheffe multiple comparison tests indicated significant differences for open-ended study patterns between pattern 1 and patterns 2, 3, 4. For forced-choice study patterns, significant differences were found between patterns 1 and 2 and patterns 3 and 4.

Another ANCOVA revealed that no significant differences exist in terms of the effect of topic familiarity on comprehension scores obtained by subjects. Finally, no significant differences were found with respect to the effect of text content on the comprehension scores of subjects.

DISCUSSION

Students do not appear to differentiate their selection of a study strategy based on either their level of familiarity with material or on the content being studied. It seems likely that students have one general study strategy, and that they employ this strategy regardless of the content being studied or their level of familiarity with the material (Simpson, 1984). However, a discussion of the study patterns evaluated in the present study is central to the interpretability of the results of the research. Study patterns established by the researcher from responses to the open-ended inventory were rather broad, global descriptions of behaviors. Likewise, the study patterns formed from responses to the forced-choice inventory were based on the general descriptions of study provided by students who participated in the pilot study. As Pace, Sherk, Peck, and Baldwin (1985) suggested, it appears that students may be unable to make fine discriminations of studying behaviors that are needed to truly assess potential differences between or benefits from the use of various study strategies.

The results of this research suggest that the study strategies selected by students have little impact on their comprehension of material. This position is evidenced by the lack of relation between study patterns and comprehension for subjects who read the familiar history passage, the unfamiliar history passage, or the unfamiliar chemistry passage. However, for subjects who read the

familiar chemistry passage, results indicate that study strategies used by these subjects did affect their comprehension. Even so, the results of the present study do not depict clearly this connection, since, as with many other studies of this type, comprehension was defined only as the number of questions answered correctly on a multiple-choice test.

CONCLUSIONS

The implications and limitations related to this study affect personnel interested in the studying behaviors of both high school and college students. First, a means of obtaining more specific descriptions from students regarding their studying behaviors is needed. Students may need to receive direct help and practice in gaining greater insight into their own behaviors while reading and studying content material. For example, investigators or teachers could ask students to record their study behaviors as they attempt them and subsequently assist students in analyzing their effectiveness in terms of test performance. The use of study strategies inventories, individual student conferences, and observation could combine to produce an accurate representation of students' self-selected studying behaviors.

Second, one implication from this study having a direct affect on the college reading practitioner is the notion that high school students engage in activities which they believe are effective for learning content. By the time

they reach college, students are understandably reluctant to abandon a familiar, comfortable strategy for learning, however inefficient it may be. Therefore, as various study strategies are taught to students, instructors should continually attempt to integrate students' self-selected study strategies with the new techniques. For example, students who report reading and rereading as their preferred method could be instructed to underline selectively or to annotate. Discussing rereading in the context of selective review and recitation may ease students' transition from the passive rereading activity to a more active approach to learning.

Third, future investigators should consider using more than one form of comprehension assessment. Written retellings, in conjunction with a multiple-choice test, would likely provide researchers with a more powerful measure of comprehension.

Finally, for study skills instruction to become an integrated, student-centered process, college reading personnel and high school content teachers should communicate with one another. Teachers at both levels could benefit from sharing experiences and ideas pertaining to study strategies instruction. Perhaps they could also begin to articulate a clear developmental sequence for teaching students to employ study strategies and subordinate study tactics.

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Table 1

Subject Assignment to Patterns from Responses to Open-ended Study Strategies Inventory

Pattern	History		Chemistry	
	Familiar	Unfamiliar	Familiar	Unfamiliar
Skim, read parts				
N	2	4	7	2
(%)	(17)	(15)	(28)	(13)
Read, read and memorize				
N	0	9	5	5
(%)	(0)	(33)	(20)	(33)
Read, review/read, reread				
N	7	9	6	4
(%)	(58)	(33)	(24)	(27)
Multiple strategies				
N	3	5	7	4
(%)	(25)	(19)	(28)	(27)
	N = 12	N = 27	N = 25	N = 15

Table 2

Subject Assignment to Patterns from Responses to Forced-choice Study Strategies Inventory

Pattern	History		Chemistry	
	Familiar	Unfamiliar	Familiar	Unfamiliar
Skimming/reading parts				
N	4	8	5	1
(%)	(33)	(30)	(20)	(7)
Read/read, reread				
N	3	7	5	3
(%)	(25)	(26)	(20)	(20)
Reading and thinking				
N	3	5	6	5
(%)	(25)	(19)	(24)	(33)
Reading and physical activity				
N	2	17	9	6
(%)	(17)	(26)	(36)	(40)
	N = 12	N = 27	N = 25	N = 15